

## (9) CLAIMS

1. A hard copy system comprising:

rewritable medium having a bistable, electrochromic, colorant susceptible to localized electrical fields;

associated with said medium, an electrode subsystem producing said localized electrical fields wherein said fields are associated with data to be printed; and

affixed to said electrode subsystem, a scanning navigation subsystem for positioning said data on said media.

2. The system as set forth in claim 1, said electrochromic colorant further comprising:

at least one layer of a molecular colorant coating wherein molecules of the coating are at least bichromal and subjectable to bistable switching between color states under influence of said localized electric fields.

3. The system as set forth in claim 2 comprising:

said molecules exhibit an electric field induced band gap change, occurring via a mechanism selected from a group including (1) molecular conformation change or an isomerization, (2) change of extended conjugation via chemical bonding change, and (3) molecular folding or stretching.

4. The system as set forth in claim 1, said electrode subsystem and navigation subsystem further comprising:

means for downloading, storing, sequencing, and printing text and images.

5. The system as set forth in claim 1 wherein said electrode subsystem and navigation subsystem are configured as a portable, hand-held, hard copy apparatus.

6. The system as set forth in claim 1 further comprising:

means for scanning an original document and for providing a data set representative of said original document as said data to be printed.

7. The system as set forth in claim 1 wherein said electrode subsystem and navigation subsystem are housed in a palm-sized device.

8. The system as set forth in claim 1 wherein said electrode subsystem and navigation subsystem are configured as a hand-held page wide electrode array device.

9. The system as set forth in claim 1 comprising:

said colorant incorporates at least one layer of a first plurality of microcapsules having bichromal, bistable colorant within the microcapsules.

10. The system as set forth in claim 1 comprising:

said medium has a said colorant on each printing surface thereof

11. A hard copy rendering method comprising:

selectively providing localized electric fields, each of said fields conforming to a predetermined picture element size;

portably transporting said fields across a printing medium such that a bistable electrochromic colorant of said medium is subjected to said electric fields; and

manipulating said electric fields for producing printed data in said electrochromic colorant and rendering said hard copy in rewritable form.

12. The method as set forth in claim 11 wherein a first polarity of said localized electric fields prints a picture element.

13. The method as set forth in claim 12 wherein a reverse polarity of said first polarity of said localized electric fields erases a picture element.

14. The method as set forth in claim 11 in a portable, hand-held scan-print system.

15. The method as set forth in claim 11 wherein said electrochromic colorant is at least one layer of a molecular colorant coating wherein molecules of the coating

are at least bichromal and subjectable to bistable switching between color states under influence of said localized electric field.

16. The method as set forth in claim 15 wherein said molecules exhibit an electric field induced band gap change, occurring via a mechanism selected from a group including (1) molecular conformation change or an isomerization, (2) change of extended conjugation via chemical bonding change, and (3) molecular folding or stretching.

17. The method as set forth in claim 11 wherein said colorant incorporates at least one layer of a plurality of microcapsules having bichromal, bistable colorant within the microcapsules.

18. The method as set forth in claim 11 comprising:  
providing a hand held apparatus for rendering the hard copy;  
in said hand held apparatus, further providing means for scanning an image and converting said image to a data set such that said data set is said printed data.

19. The method as set forth in claim 18 comprising:  
prior to printing the image, manipulating said data set for altering size of said image on the hard copy.

20. The method as set forth in claim 18 comprising:

prior to printing the image, manipulating said data set for altering the appearance of said image on the hard copy.

21. A scanning printer comprising:

a housing adapted for handheld use; and

mounted within said housing, an electrode array fixedly aligned for printing data rasters, a navigation subsystem for tracking motion of said electrode array, a data port for transmitting data with respect to said data rasters, and connecting said array, subsystem and port, electronic circuitry associated with said tracking and said data rasters.

22. The apparatus as set forth in claim 21, said electrode array comprising:

a plurality of printheads tuned to provide pixel-sized, localized electrical fields.

23. The apparatus as set forth in claim 22 wherein said printheads are tuned for

association with molecular colorant print media.

24. The apparatus as set forth in claim 23 wherein said molecular colorant print

media has a substrate and at least one layer of molecular colorant on a printing surface of said substrate.

25. The apparatus as set forth in claim 24 wherein the molecular colorant layer is an electrochromic colorant having at least one layer of a molecular colorant coating on said substrate wherein molecules of the coating are at least bichromal and subjectable to bistable switching between color states under influence of said localized electric field.

26. The apparatus as set forth in claim 25 wherein said molecules exhibit an electric field induced band gap change, occurring via a mechanism selected from a group including (1) molecular conformation change or an isomerization, (2) change of extended conjugation via chemical bonding change, and (3) molecular folding or stretching.

27. The apparatus as set forth in claim 21 wherein said printheads are tuned for association with a plurality of microcapsules having bichromal, bistable colorant within the microcapsules.

28. The apparatus as set forth in claim 27 further comprising:  
sensors for generating image signals representative of an image as said sensors are scanned across the image, and in a fixed position relative to said sensors, navigation devices for forming at least one position signal indicative of inherent structure related properties correlated to said image signals as said sensors are scanned, a data processor connected to said sensors for processing said image signals and position signals, and a memory connected to said

processor for storing image signals and position signals as said data rasters.

29. A handheld copier system comprising:

rewritable media having a bistable, electrochromic, colorant layer  
susceptible to localized electrical fields; and

in a hand-held scannable housing, sensor means for generating image  
signals representative of an image as said sensor means is scanned across the  
image, and in a fixed position relative to said sensor means, navigation means for  
forming at least one position signal indicative of inherent structure related  
properties correlated to said image signals as said sensor means is scanned, and  
connected to said sensor means, processor means for processing said image  
signals and position signals, connected to said processor means, memory means  
for storing image signals and position signals, and connected to processor means,  
electrode means for producing said localized electrical fields wherein said fields are  
associated with said image signals and said positions signals for printing a copy of  
said image on said rewritable media.

30. The system as set forth in claim 29, said navigation means further  
comprising:

connected to said electrode subsystem, electrical generating means for  
producing said localized electrical fields.

1 31. The system as set forth in claim 29 said electrochromic colorant layer further  
2 comprises:

3 at least one layer of a molecular colorant coating wherein molecules of the  
4 coating are at least bichromal and subjectable to bistable switching between color  
5 states under influence of said localized electrical field.

6 32. The system as set forth in claim 31 comprising:

7 said molecules exhibit an electric field induced band gap change, occurring  
via a mechanism selected from a group including (1) molecular conformation  
change or an isomerization, (2) change of extended conjugation via chemical  
bonding change, and (3) molecular folding or stretching.

11 33. The system as set forth in claim 31, the molecular colorant coating further  
12 comprising:

13 a mosaic pixel pattern of primary color pixels such that full color printing is  
14 produced by said electrode subsystem on said media.

15 34. A method for scanning and printing, the method comprising:

16 scanning a document with a self-contained, hand held, scanning and  
17 printing apparatus; and

18 printing data collected during said scanning on a rewritable medium with  
19 said apparatus such that said document is reproduced on said medium.



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35. The method as set forth in claim 34 wherein said rewritable media is a rewritable media having a bistable, electrochromic, colorant layer susceptible to localized electrical fields.

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